

Note on the Second Catalogue of Micrometrical Measurements of Double Stars made at the Temple Observatory, Rugby.

By J. M. Wilson and G. M. Seabroke.

In the forthcoming volume of the *Memoirs* (vol. xliii.) will appear the Second Catalogue of our Micrometrical Measurements of 398 Double Stars. By some accident the introductory observations that were sent with them were mislaid, and the fact was not discovered till the sheets were printed off. We should be glad of an opportunity of making a few remarks on them.

They consist chiefly of measures made in the years 1874, 5, 6, 7, with a few of older date, and include the last measures taken in the old Observatory. The temporary building was taken down in June last, and a new and permanent Observatory has been built, along with a curator's house, on a site purchased for this purpose by the governing body. An honorary curator and sub-curator of the Observatory have been added to the staff of the school.

The instrument and the micrometer are the same as those described in the introduction to the First Catalogue (*Memoirs*, vol. xlii), viz. Alvan Clark's  $8\frac{1}{4}$ -inch refractor, and Dollond's parallel wire micrometer. The observations were made, with few exceptions, by ourselves, with the frequent assistance of Mr. Percy Smith, F.C.S. (the present sub-curator), in measures of position, when any doubt or discrepancy showed itself. A magnifying power of about 400 was always used.

As in previous years, much of the very limited time at our disposal has been spent in miscellaneous observations on the Moon, planets, clusters, nebulae, &c., and in interesting and instructing members of the school in astronomical matters.

It may be of interest to give the result of an analysis of our distance-measures and those of Dunér and Mr. Gledhill, made by Otto Struve in the *Vierteljahrschrift der Astronomischen Gesellschaft* (12. Jahrgang, 2 Heft.). He finds

	"	
Gledhill	= Dunér + 0.151	from 108 comparisons.
Wils. & Seab.	= Dunér + 0.143	" 101 "
Struve	= Dunér + 0.101	" 324 "

But he points out that Struve's distances need a constant correction of +0".06. Hence, to reduce the distance-measures by these observers to a uniform scale, the following corrections must be applied:—

	"
Struve	+ 0.06
Dunér	+ 0.17 for stars below 12".
Gledhill	— 0.02
Wils. & Seab.	— 0.03

Otto Struve recommends us to separate our observations, so that it might be possible to ascertain our separate personal errors. We have, however, ascertained its amount from a considerable number of observations, viz.  $W = S + 0''.1$ , and this agrees very nearly with the amount ascertained by himself from the few separate observations published, viz.  $W = S + 0''.15$ . But, from a comparison of our own measures with those of others, we concluded that our errors were of opposite signs, and that the mean of our measures would not show any appreciable systematic error. This appears from Otto Struve's investigation to be the case. And on this ground we shall probably continue to give joint results, as being more trustworthy and more immediately available to the orbit computer.

We may add, moreover, that it is our opinion that a personal error in measures of this kind is very different in nature from those made in time observations; that it is masked in individual cases by accidental errors of far larger magnitude; and that it would be quite unsafe to apply it as a constant correction. Our present opinion is that a series of most careful measures of distance made by us on an easy star on a single fine night cannot be relied on to  $0''.1$ , and that the only way of getting greater accuracy is to multiply the nights of observation.

Otto Struve also expresses the wish that our distances should be given to hundredths of a second, and they are so given in the Second Catalogue. We are very grateful to him for his encouraging criticism, and his appreciation of our circumstances—"das Instrument in Rugby in grossem Maasse zur Befriedigung wissenschaftlicher Neugier dienen muss, und überdies die Beobachter durch ihre amtlichen Pflichten an der bekannten Lehranstalt vielfach in Anspruch genommen sind."

*Rugby, Nov. 7, 1877.*

#### *On the Atmospheric Lines between the two D Lines.*

By H. C. Russell, Esq., Director of the Sydney Observatory.

I have a powerful spectroscope made by Hilger, of London, of which the greatest dispersion is equal to eighteen  $64^\circ$  prisms, and the definition so fine that I can measure one three-hundredth part of the space between the D lines. With this I have frequently examined the lines between the D lines, and find only seven; while it is stated that at Potsdam nine are seen; and many years since (1868) Dr. Huggins saw twelve at Kew, and in 1875 Colonel Campbell recorded nineteen in London. These facts led me to make a careful examination and measures of all the lines I could see here. Perhaps the information may be interesting to the members of the Royal Astronomical Society.

The diagram has been prepared by enlarging the drawings kindly given to me by Dr. Huggins and Colonel Campbell, and a careful plot from my own measures. I may state that, in order